THE ATOM

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THE ATOM

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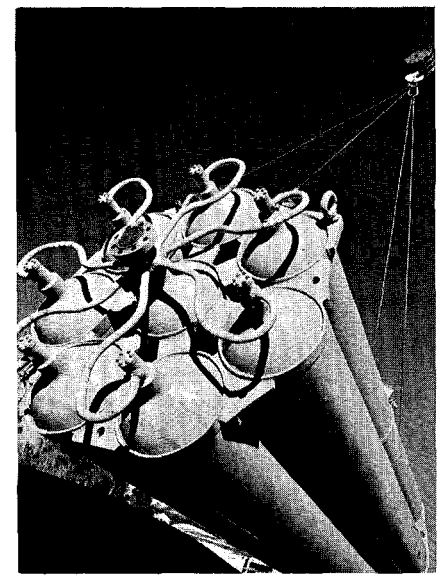


COVER:
Surplus Air Force missile fuel tanks will increase hydrogen storage capacity for LASL's N division. Story on page 11.

short subjects

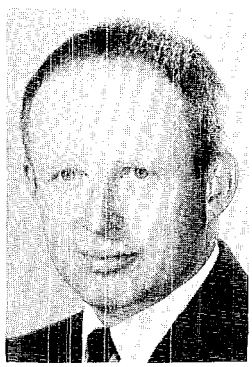
Douglas Allen, a physicist at the Atomic Energy Research Establishment, Harwell, England, is working in P division under a cooperative reciprocal exchange agreement between the Los Alamos Scientific Laboratory and the United Kingdom Atomic Energy Authority. William Stein, P-2, now at Harwell, is the other half of the exchange.

Allen began work at LASL Nov. 15. With Harwell for the past 20 years, he received his B.Sc. in (special) physics from London University and worked in radar research for the British government at Malvern, U.K., during World War II. He went to Harwell after the war and has since been working there in nuclear physics research. Allen is joined in Los Alamos by his wife, a son, 15, and a daughter, 6. Two grown daughters remained in England.

Albert V. Crewe has announced his resignation as director of Argonne National Laboratory in order to return to full-time research and teaching. Director of the laboratory since 1961, Crewe will continue in his post until a successor is chosen. He has been a member of the University of Chicago faculty since 1955 and will remain with the university as a professor in the department of physics and in the Enrico Fermi Institute for Nuclear Studies.

William R. Stratton, N-2, has been appointed by AEC Chairman Glenn T. Seaborg to serve on the Advisory Committee on Reactor Safeguards. This committee advises the Atomic Energy Commission in regard to the hazards of proposed or existing reactor facilities and the adequacy of proposed reactor safety standards. Stratton, with LASL since July, 1952, received his Ph.D. in physics from the University of Minnesota.

Thomas W. Newton, CMF-2 staffer, has been granted professional research and teaching leave starting this month to spend six months at the State University of New York, Stonybrook. While there, he will teach a course in advanced inorganic chemistry and consult with the chemistry department. Newton received his B.S. and Ph.D. degrees in chemistry from the University of California, Berkeley.



Thomas R. Roberts, CMF-9, has been named to a second six-year term as a regent of the University of New Mexico. Gov. David Cargo nominated Roberts to the post last month. A former state representative from Los Alamos County (1957-'60,), he has been with LASL since August, 1951. He earned a B.A. degree in chemistry from Harvard, and M.A. and Ph.D. degrees in physics from the University of Minnesota. His wife, Carol, is an employe of H-4. They have three children, Thomas, Margaret and Shelley.

P. W. Keaton, Jr., P-DOR, and Dr. George E. Owen, professor of physics at Johns Hopkins University, have written a three-volume publication entitled "Fundamentals of Electronics." The first volume, covering linear circuit theory, was released recently by Harper & Row, publishers. Future volumes will deal with the fields of physical electronics and applied circuits, respectively. Keaton received his B.S. degree in physics from Emory and Henry College, Emory, Va., and his Ph.D., also in physics, from John Hopkins. The volumes were written while Keaton was a research associate at Johns Hopkins.

William M. Visscher, T-9, left last month for the University of Washington, Seattle, where he is teaching a nuclear physics course on the undergraduate level. Later, he will teach a graduate course in solid state physics and also do some research. Visscher received his B.A. degree in physics from the University of Minnesota and his Ph.D. degree in theoretical physics from Cornell University.

On leave of absence, Visscher will return to LASL in June.

more short subjects . . .

Henry A. Sandmeier, T-DOT, now on a year's leave of absence from the Los Alamos Scientific Laboratory to serve as visiting professor of nuclear engineering at Purdue University, was guest lecturer at a recent public seminar sponsored by Purdue's department of nuclear engineering. He spoke on "The Nuclear Rocket Program at Los Alamos."

A theoretical physicist, Sandmeier holds undergraduate degrees in electrical engineering from the Swiss Federal Institute of Technology, Zurich, Switzerland, and the Massachusetts Institute of Technology. He also holds an M.S. from M.I.T., and a D.Sc. in electrical engineering and a Ph.D. in physics, both from the Swiss Federal Institute of Technology.

Sandmeier was formerly consultant to the International Atomic Energy Agency, Vienna, Austria. He also served with the Office of Naval Research as liaison scientist for nuclear physics, U. S. Embassy, London, England.

Miss Shirley Nims, daughter of Mr. and Mrs. **Quay Nims,** has been spending the first semester of this academic year on a round-the-world study trip aboard the S. S. Ryndam. The study cruise, sponsored by the Seven Seas division of Chapman College, Orange, Calif., offers college credit for the semester's courses. Students participating in the trip study aboard ship six days a week, in addition to taking part in special programs and tours in European, North African and Asian ports. Among the cities visited by the floating campus are Lisbon, Barcelona, Marseilles, Civitavecchia, Piraeus, Istanbul, Alexandria, Port Said, Bombay, Colombo, Port Swettenham, Bangkok, Hong Kong, Kobe and Yokohama. After a stop in Honolulu, the ship will arrive in Los Angeles Feb. 4.

As a participant in the LASL summer student program, Shirley was employed in group H-5 during the summer of 1965. Mr. and Mrs. Nims are employed in group CMB-6 and CMB-14, respectively.

Louis Rosen, MP division leader, has been appointed a member of the subcommittee on nuclear structure of the National Academy of Sciences—National Research Council. The appointment was announced recently by Dr. Frederick Seitz, president of the research council.

Rosen has been at Los Alamos since the Manhattan Project during World War II. He has received a number of honors in the past, including the E. O. Lawrence Award in 1963 for "the development of new experimental techniques and their application to a better understanding of the nucleus as well as to the diagnosis of weapon behavior."

Miss Martha Best, daughter of **George Best,** K-1, has been awarded an American Field Service International Scholarship for a year's study in Australia.

Martha, a senior at Los Alamos High School, leaves in mid-January to continue her studies at the Conservatorium High School in Sydney, which operates in conjunction with the New South Wales State Conservatorium of Music. Morning classes are devoted to normal general education courses, and afternoons are utilized for music studies.

While in Australia, she will live with the Harry Skelsey family, who reside in Kogarah, a suburb of Sydney.

The American Field Service International Scholarships have the primary objective of promoting understanding and friendship among the peoples of the world. They are granted both to U.S. students for study abroad and to foreign students for study in this country. During each of the last several years, about 300 students from the United States have been granted one-year scholarships in 28 different countries, about 850 U.S. students have been granted summer scholarships in 36 countries, and approximately 3000 students from 60 countries have received awards for residence and study in the United States.

Martha is the third Los Alamos High School student to be awarded such a scholarship, the others having been Barbara Woodward and Barbara Roensch. Currently, the fourth student from abroad is attending Los Alamos High School.

Martha will return home in January, 1968.

Phoebus 1B Readied For Run

By BILL RICHMOND

SOMETIME NEXT MONTH a group of scientists, technicians and observers will gather in southern Nevada for a full-power test of the Phoebus-1B reactor—designed and developed by the Los Alamos Scientific Laboratory.

This planned 30-minute test, another step in man's efforts to develop a flyable nuclear rocket engine, will be conducted at the Nuclear Rocket Development Station in the southwest corner of the Nevada Test Site.

Phoebus-1B is the second generation of reactors in Project Rover—America's program to develop a nuclear propelled rocket. The Los Alamos Scientific Laboratory has the responsibility of designing and developing a reactor suitable for incorporation in a flyable rocket engine known as NERVA (Nuclear Engine for Rocket Vehicle Application).

The task of developing a nuclear rocket for possible missions into deep space began in 1955. The project

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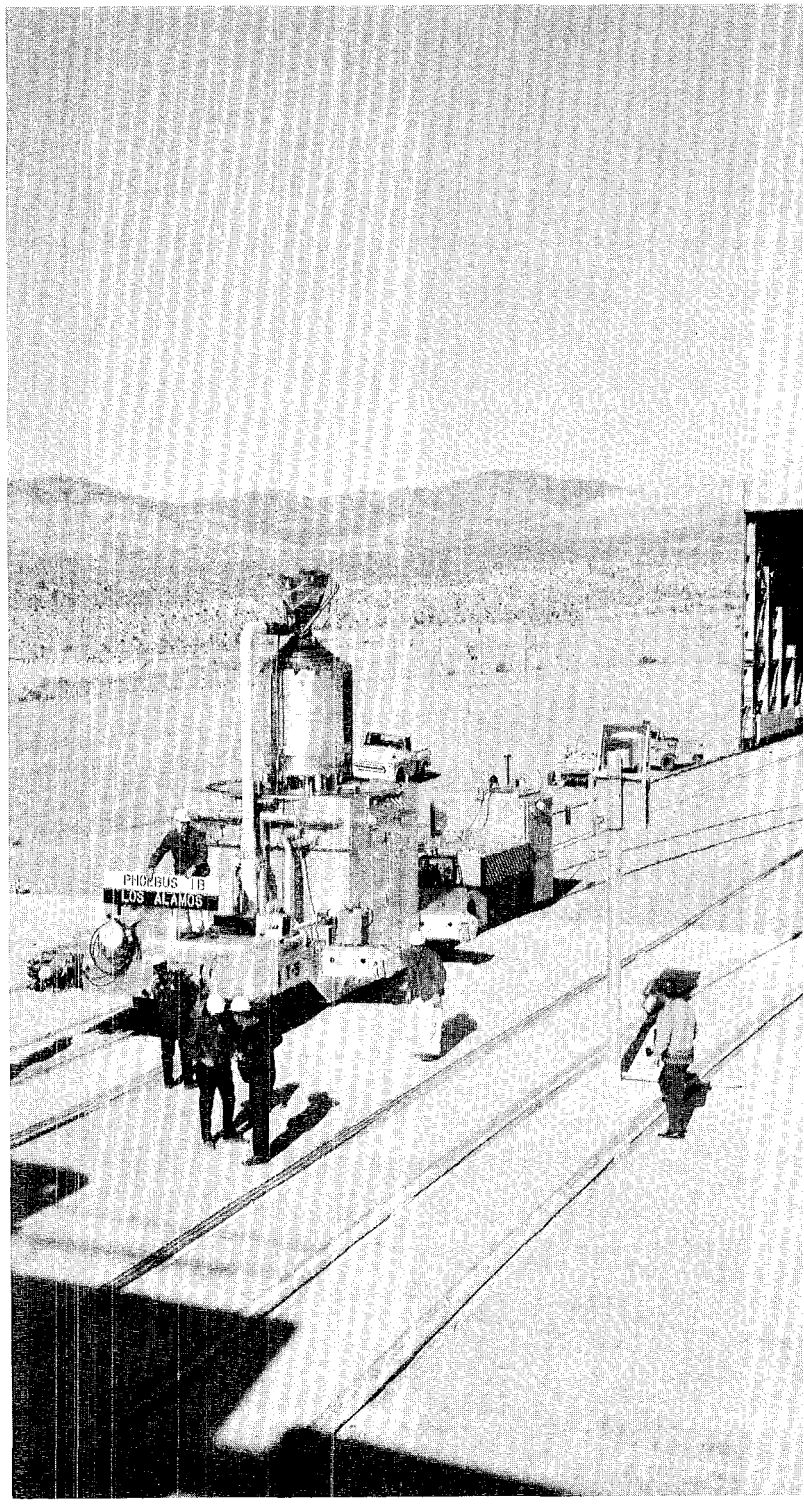
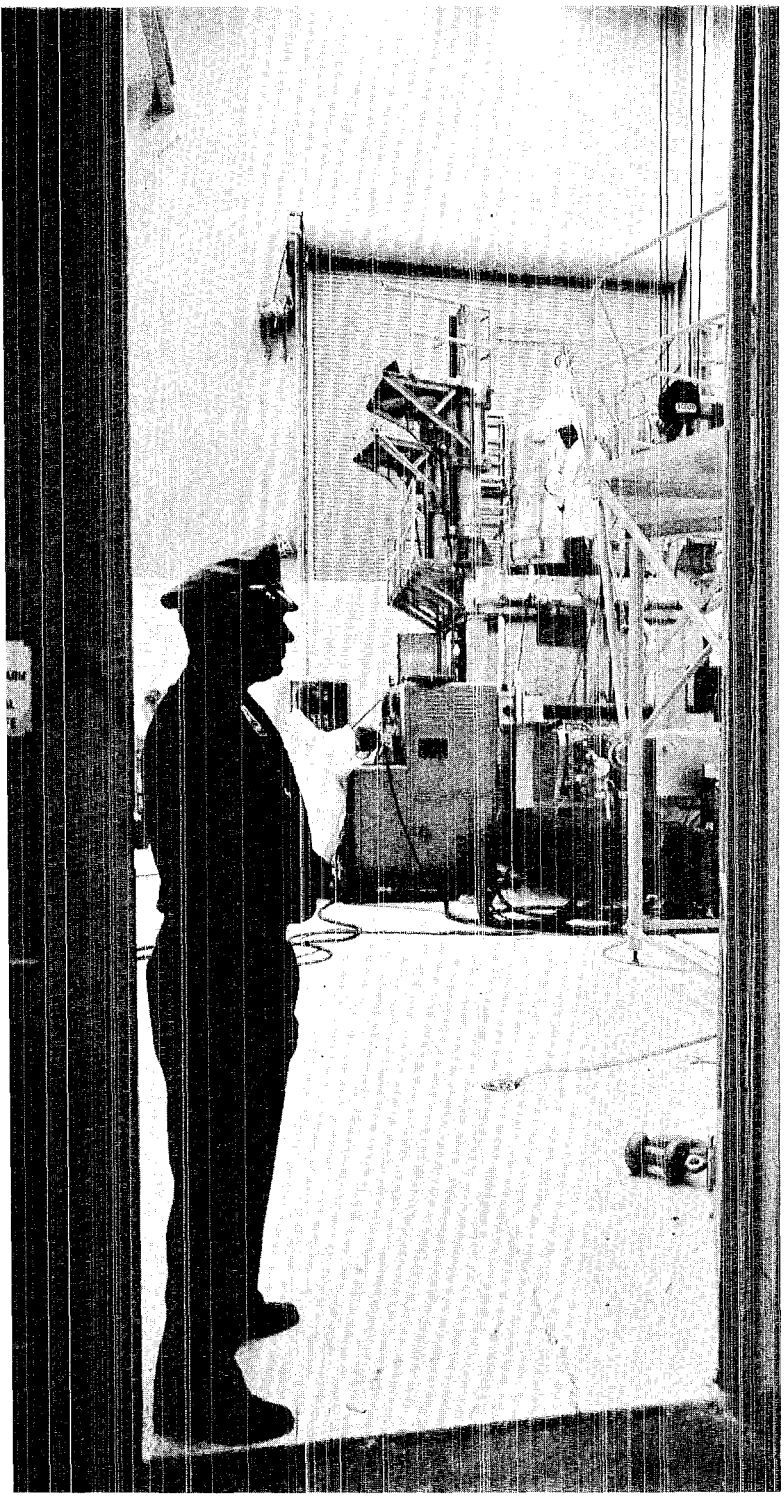


Phoebus-1B moves along the "world's slowest railroad"—The Jackass & Western—from the R-MAD building to the test cell in preparation for next month's full power run.



The reactor, after being shipped to Nevada from Los Alamos, is reassembled in the R-MAD building.

Phoebus 1B . . .

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is administered by the Space Nuclear Propulsion Office under the joint sponsorship of the Atomic Energy Commission and the National Aeronautics and Space Administration.

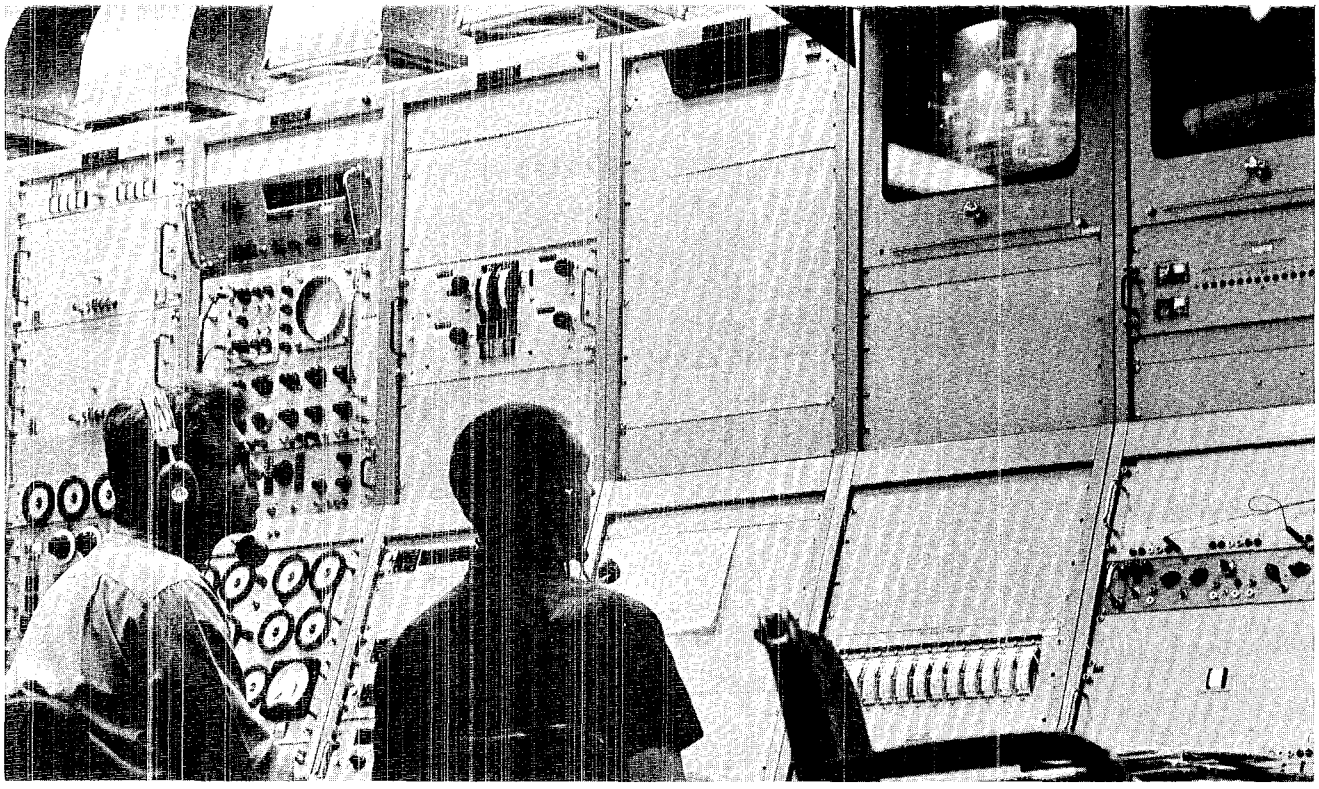
Since the program began, 10 LASL reactors have been tested—including one known as TNT (Transient Nuclear Test) which was deliberately destroyed to obtain basic reactor shutdown information.

Phoebus-1B has the approximate size and design of LASL's Kiwi-B-type and Phoebus-1A reactors. Phoebus-1A, last reactor tested, was operated at full power on June 25, 1965.

The power level goal in the upcoming Phoebus-1B test will be 1,500 megawatts. If achieved, this power level will develop about 70,000 pounds of thrust. At full power, the Phoebus-1A developed about 50,000 pounds of thrust.

The running time for the full-power test also will be increased. Phoebus-1B is expected to undergo a 30-minute run at full power as compared to 11 minutes for Phoebus-1A.

The Phoebus-1B test will provide the same thermal stresses in fuel elements as will be experienced in the later Phoebus-2 series and will furnish needed fuel element corrosion data. The actual reactor incorpor-



A full-power nuclear reactor test is monitored continuously in the control room. Phoebus-1A was operated at full power June 25, 1965.

ated into a flyable nuclear rocket engine is expected to be of the Phoebus-2 type with a power level of 5,000 megawatts capable of delivering 230,000 pounds of thrust. The initial test of the Phoebus-2 series is tentatively scheduled for late 1967 or early 1968.

The nuclear rocket reactors are characterized by very large power levels and short operating times. During its operating period the Phoebus-1 reactor develops power comparable with Hoover Dam—one of the world's largest suppliers of hydroelectric power. The Phoebus-2 should set a new power record.

The longer duration of the Phoebus-1B test operation has been made possible by a substantial expansion of Test Cell "C" at NRDS which has been made since the Phoebus-1A test. The liquid hydrogen capacity has been increased from 100,000 gallons to more than a million gallons, and a new heat exchanger system has been designed and installed to provide the high pressure hydrogen gas used to drive the turbopump which feeds the liquid hydrogen coolant to the reactor.

The Phoebus-1A reactor overheated at the end of its 1965 test when the liquid hydrogen supply was depleted. Although the immediate cause was a spurious indication of the liquid hydrogen level, a contributing factor was the attempt to obtain the maximum running time with a limited hydrogen supply. A pressurized hydrogen dewar has been installed to provide an automatic reserve for reactor shutdown in case of loss of primary coolant flow.

Other new features of the expanded test cell include a retractable radiation shield which surrounds the reactor during the test operation and a new liquid hydrogen feed system developed by the Rocketdyne Division of North American Aviation.

A thorough checkout of the new test facility has been conducted over the past several months by the field test organization which includes personnel from NERVA contractors Aerojet General and Westinghouse and the electrical support contractor, EG&G, Inc., as well as LASL personnel.

The first reactor for the Rover program was Kiwi A, tested on July 1, 1959. The Kiwi reactors were never intended to "fly" in a nuclear engine and were named after the flightless bird of New Zealand. (The Phoebus reactors are named after the mythical Greek god of light, Phoebus Apollo.)

The first LASL reactors—the Kiwi-A-type—were of a 100 MW design. Three of these had been designed,

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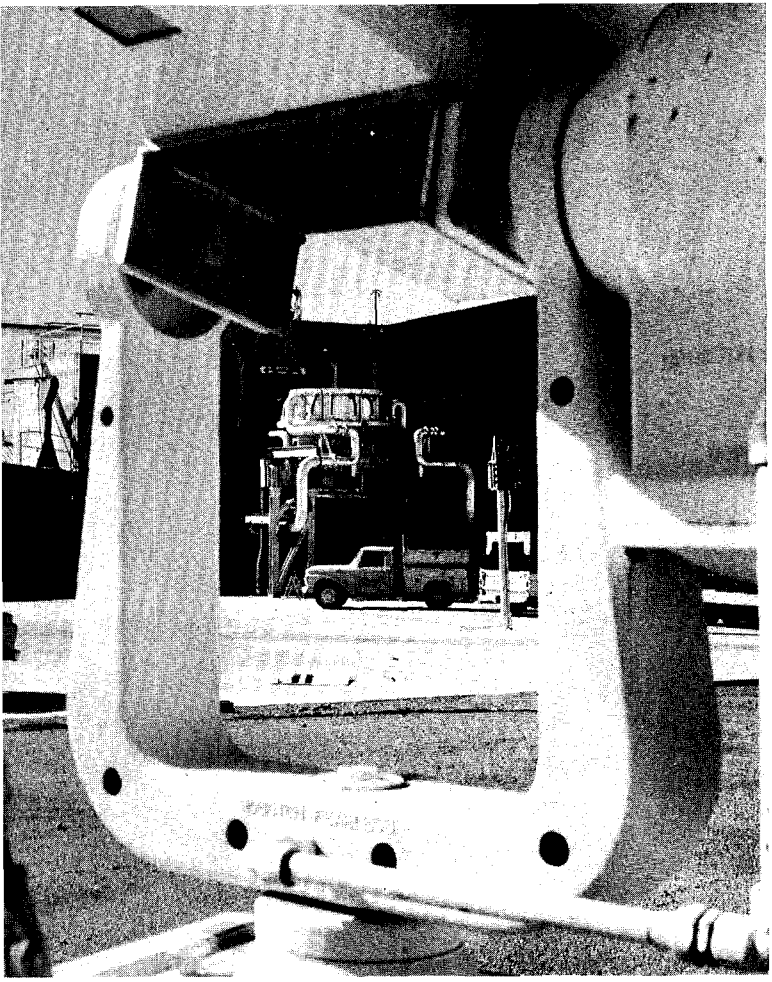

Remote television camera mount for monitoring Phoebus run frames Test Cell "C" wall with the new radiation shield in place.

Phoebus 1B. . .

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constructed and tested by late 1960. In the process a great deal was learned regarding the fundamentals of uranium-graphite reactors.

However, some structural failures were experienced in Kiwi A' and A-3, and the decision was made to investigate and carry along three different reactor core designs for the next generation of Kiwi reactors.

These 1000-MW reactors were called Kiwi-B series. In December, 1961, Kiwi-B-1A was tested at 300 MW with gaseous hydrogen. A major milestone in the Rover project was reached on September 1, 1962, when the Kiwi-B-1B was tested. This was the first run with liquid hydrogen as the propellant.

A series of other tests were made at NRDS and then in 1964 another giant step in the program was taken. On August 28 Kiwi B-4E ran essentially at full power and temperature for 8 minutes. Two weeks later Kiwi-B-4E was restarted and ran for an additional 2½ minutes—thus proving that re-start was feasible.

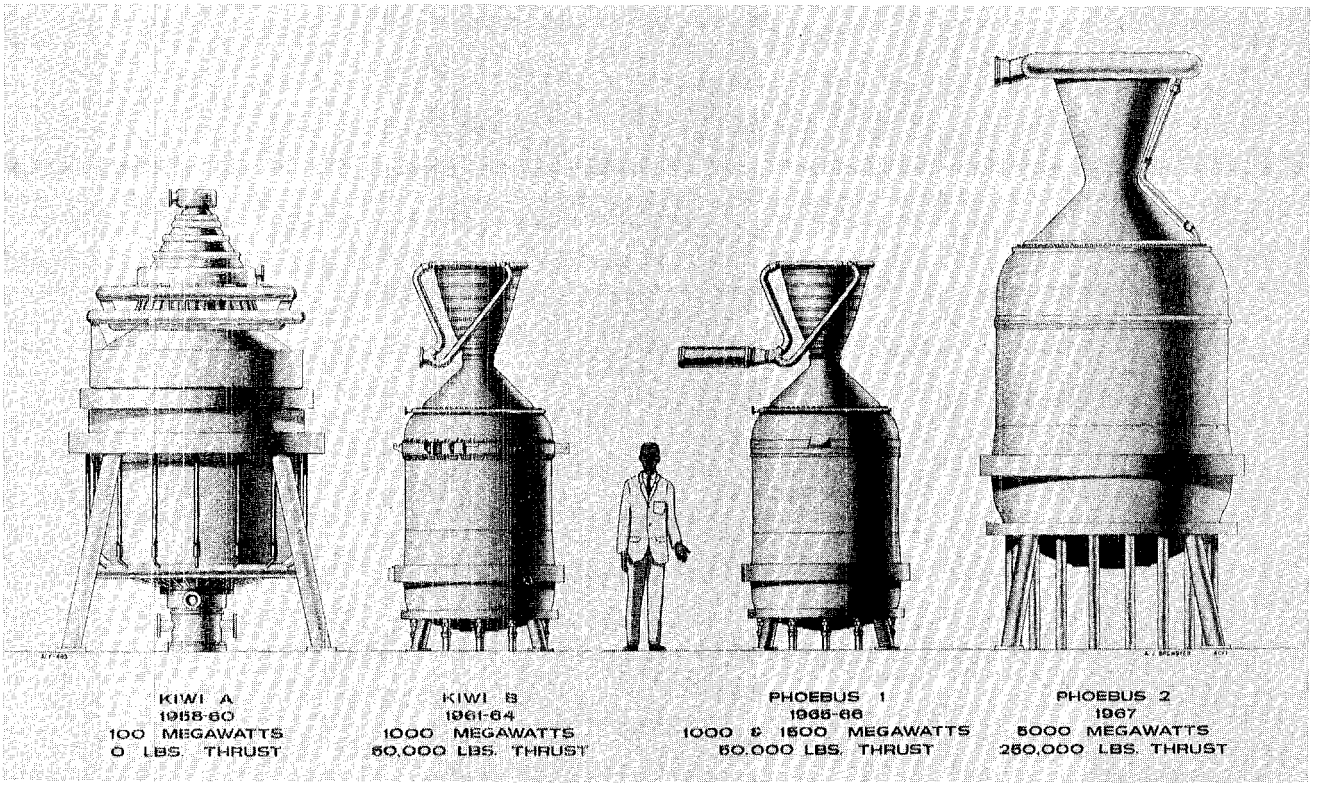
The Kiwi-B-4E tests were as successful as the LASL scientists had hoped for.

The testing of a Rover reactor involves much more than is apparent to the casual observer.

Test operations begin in Los Alamos after the reactor is designed and developed—and the decision is made to test. Each reactor is assembled in the critical assemblies laboratory at LASL and checked out at very low power. The reactor is then taken apart and shipped to the Nuclear Rocket Development Station at Jackass Flats, not far from the AEC's Nevada Test Site about 80 miles northwest of Las Vegas, Nevada.

NRDS was selected as a test site for Rover reactors for a number of reasons. One is that these reactors discharge measurable quantities of radioactive particles into the atmosphere, though the "fallout" is equal to only a minute fraction of that from the smallest atomic bomb. Another reason is the unlikely possibility that such reactors might explode. NRDS offers enough space so that testing personnel can keep a safe distance from the reactors during tests.

When the reactor arrives at NRDS it is sent to the R-MAD (Reactor-Maintenance, Assembly and Disassembly) building. In one of the assembly bays of



Artist's drawing illustrates the relative size of reactors in Project Rover from the first Kiwi to the advanced Phoebus.

the R-MAD building, the reactor is reassembled on a special railroad car. A locomotive moves the reactor on railroad tracks to the test cell. Still on the test car, the reactor is "plugged in" to propellant, instrumentation and control lines in the outside face of the wall of Test Cell "C".

When all personnel have withdrawn to the control point (2.2 miles distant) or other safe stations, control mechanisms increase the reactivity of the reactor core by withdrawing neutron-absorbent substances, and coolant-propellant flow begins. Reactor power is raised in a selected pattern to a predetermined level, held there for a predetermined number of minutes, and then lowered again. Performance data are continuously transmitted to the control point by means of hundreds of electronic channels.

After the power has dropped, it may be raised again for the purpose of measuring any reactivity loss of the system. The reactor is then shut down. After a cooling period, the reactor and its car are moved by remotely controlled locomotive to the disassembly bay of the R-MAD building.

This heavily shielded disassembly bay is equipped with remote manipulators, viewing ports and television so that reactors can be taken apart for analysis after testing. Examination and analysis of the reactor parts is carried out in the R-MAD building and at LASL.

The first-time viewer of a Rover reactor test expects to see a blinding flash, or a burst of activity or at least hear a loud "bang". But it doesn't happen that way. What has been briefly described here on "Run Day" takes several hours to accomplish.

And, as one NRDS veteran describes the lack of visible excitement in the control room: "These men are all pros. They know what they are doing and remain calm while it's happening."

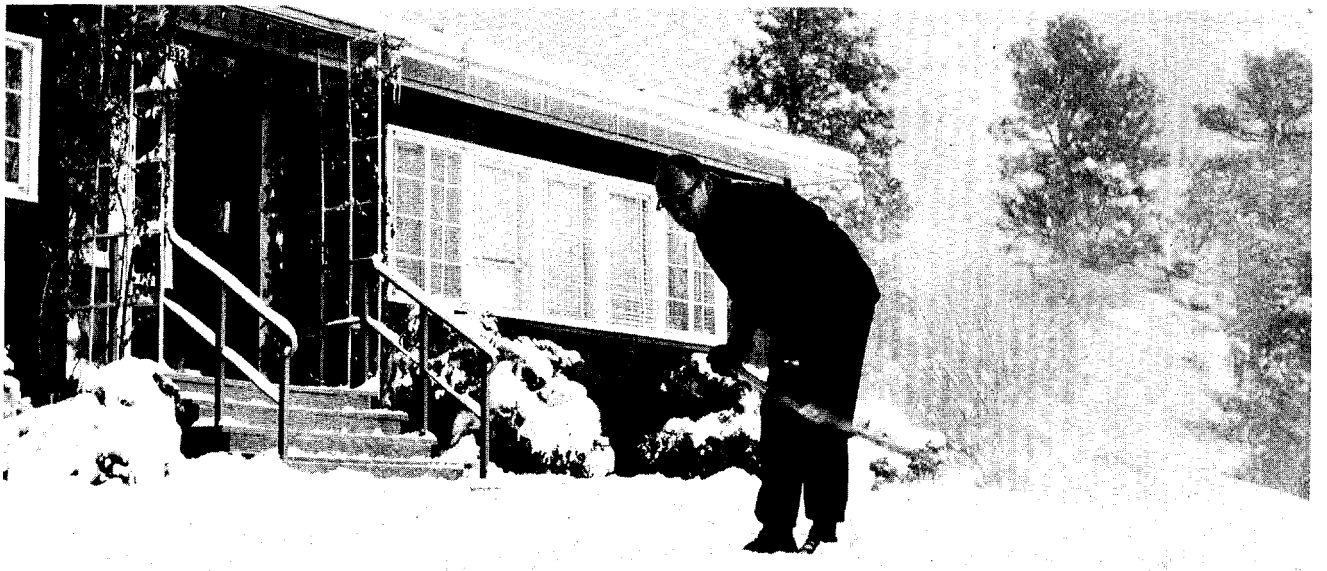
Rover Reactor Runs

	REACTOR	FULL POWER RUN
1.	KIWI A	July 1, 1959
2.	KIWI A'	July 8, 1960
3.	KIWI A-3	October 19, 1960
4.	KIWI B-1A	December 7, 1961
5.	KIWI B-1B	September 1, 1962
6.	KIWI B-4A	November 28, 1962
7.	KIWI B-4D	May 13, 1964
8.	KIWI B-4E	August 28, 1964
9.	T-N-T	January 12, 1965
10.	PHOEBUS 1-A	June 25, 1965
11.	PHOEBUS 1-B	
12.	PHOEBUS 1-C	
13.	PHOEBUS 2	

Winter Comes to the Hill

The winter's first "big snow" came just in time for Los Alamos youngsters to take advantage of Christmas sleds and skis. After more than three weeks of blue skies and temperatures hovering around 50, the first December snow finally came the day after Christmas. A seven-inch snowfall was recorded in Los Alamos Dec. 26 and 27, bringing cheers from the Hill's skiers who had been eying bare Pajarito mountain with anguished cries of "Think Snow!" ABOVE, from front, Leon Mills, Robert Dinegar, Tim Pulliam —and Missey—enjoy the first sledding of the season. BELOW, Dan Stillman, J-8, even manages a smile as he shovels his walk.

Photos by
BILL JACK RODGERS



ABOVE, Dr. Paul Flynn, H-2, discovers his car really is under that mound of snow. RIGHT, broom and scraper make short work of windshield cleaning for John Steel, GMX-1. BOTTOM, county snowplow crews were aided by the sun in getting the streets cleared off.

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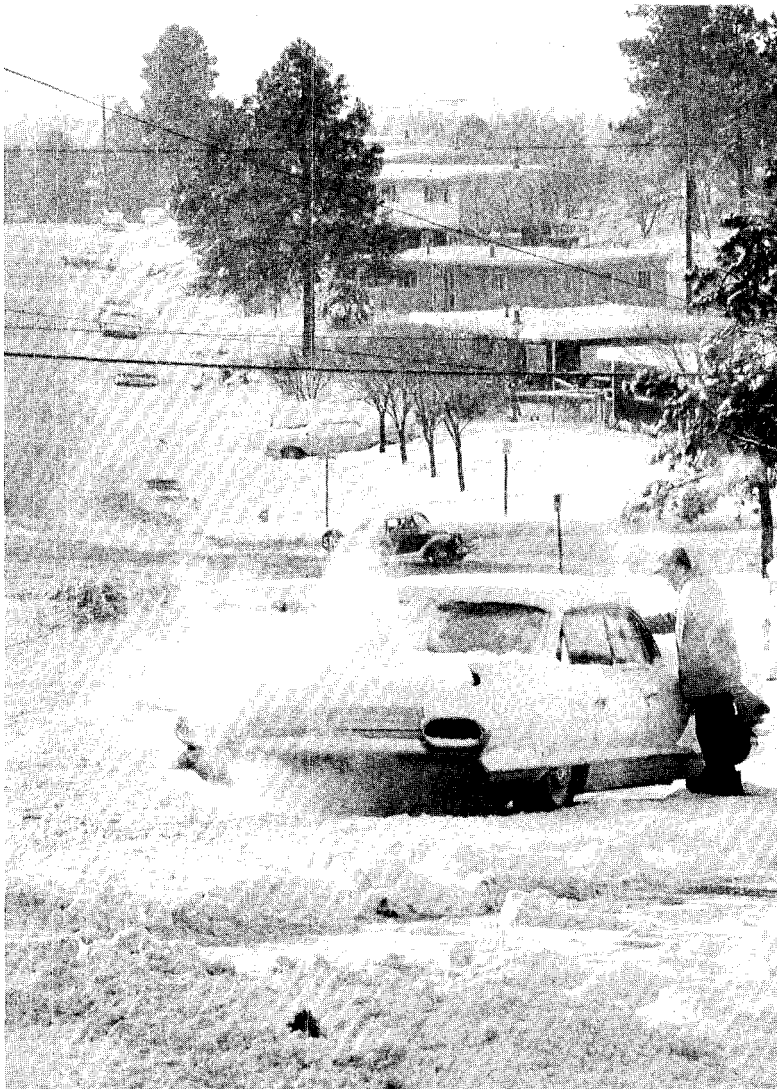

Winter on the Hill

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Rainer Stammler tries out his skis on a slope near home as twin sisters Brigitte and Heidi offer encouragement. Their father, Manfred Stammler, works at GMX-2.

Lying in the snow to put on tire chains is a chilly job for Jim Brophy, SD-5. Noted photographer Bill Jack Rodgers, "This picture should have been in color—his hands were blue."

Bernice Nagy, Travel cashier, issues a travel advance to Billy Claybrook, D-8, for forthcoming trip.

Albuquerque or Travel Office Can Get You T

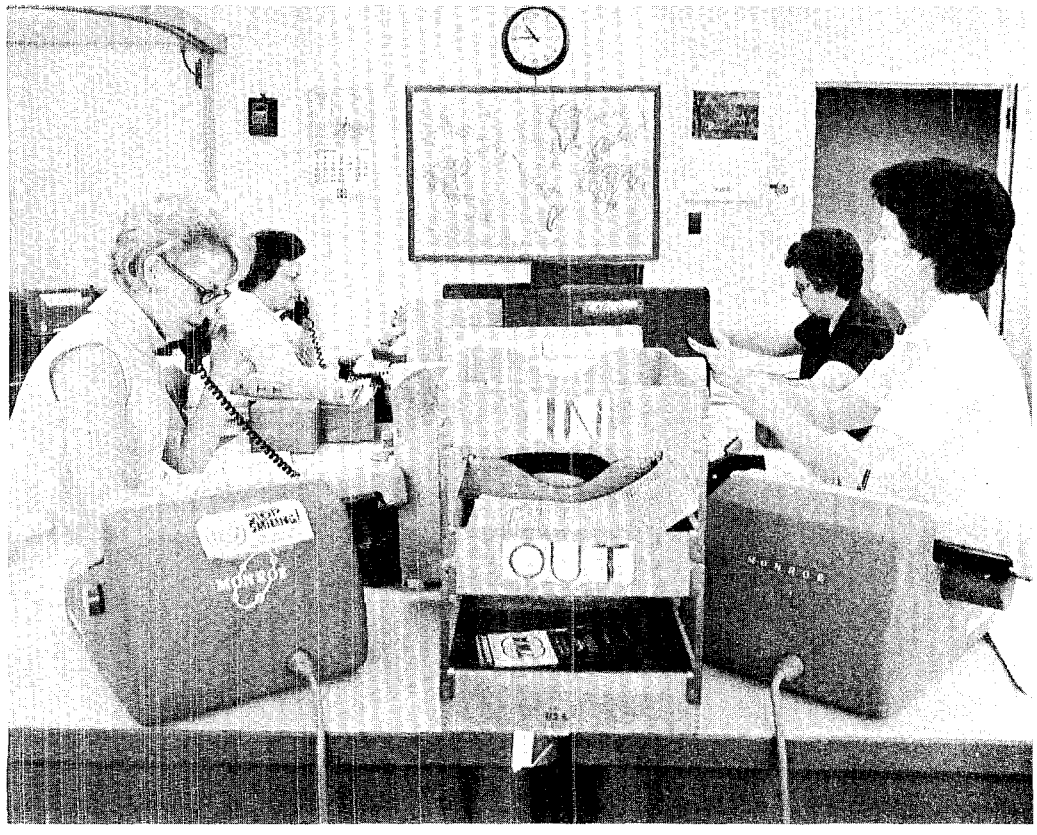
The phone in LASL's travel office rings. Problem: a LASL staff member must attend an important last-minute scientific conference called for tomorrow on the east coast, and must be back the day after that to chair a meeting in Los Alamos.

Big order? Not for the LASL travel office. Such a trip is one of many responsibilities delegated to Travel. This indispensible Laboratory service unit handles a staggering volume of official travel—more than a million and a half dollars worth last fiscal year. In many cases, the traveler himself is probably unaware of the many behind-the-scenes procedures his hurried trip called into action.

Headed by Charles Harper, former assistant business manager, the travel office staff handles a myriad of details whenever a LASL employe makes a trip.

Amsterdam--

here



Center of travel operations revolves around reservations area. From left are Janice Dye, Betty Hicks, Jean Kelley and Mildred Hicks.

A reservations clerk works with the traveler's group secretary, or with the traveler himself, in finding the most satisfactory itinerary for the trip. Meanwhile, the traveler fills out an official Travel Request Form, which is required on all trips of at least overnight, has it approved by his division leader and forwards it to the travel office.

After the itinerary has been determined, the travel clerk requests reservations from the carrier concerned—usually an airline. Since Travel is in almost constant contact with the airlines, most reservations can be confirmed very quickly. TWA in Albuquerque and Continental and Frontier Airlines in Denver work with Travel to secure connecting reservations with other airlines when necessary.

Ticketing is expedited by a "teleticketing" machine installed in the travel office several years ago, the first of its kind in New Mexico. After the reservations are verified, TWA in Albuquerque punches a tape containing information for the ticket. The tape is fed to the teleticketing transmitter and is printed out on blank tickets in the travel office. The tickets, together with a cash advance for the trip, are then issued to the traveler.

For an employe traveling on official business, hotel accommodations are reimbursed at actual cost, and a daily meal allowance not to exceed $8 is permitted. For one-day official travel between Los Alamos and other local areas, such as Albuquerque, meal and other costs are reimbursed on an actual expense basis. Although no Travel Request Form is required for local one-day trips, it is necessary to notify the travel office in advance for insurance purposes.

An official trip to almost anywhere usually begins—and ends—with a Zia Company taxi and with Carco, Los Alamos's only air connection with the outside world. Zia taxis pick up official travelers either at home or at the office and deliver them to the airstrip for Carco flights. And passengers returning to The Hill via Carco find Zia taxis waiting for them at the airport. On some occasions, official travelers are taken by taxi to Santa Fe or Albuquerque—particularly in the winter when Carco schedules are disrupted by snow.

Patience is a prime requisite for the travel office staff. Assistant Group Leader Mrs. Jean Kelley, who has been with the LASL business office since 1947, estimates that of some 10,000 trips last year, at least one change in reservations was necessary in about 50 per cent of the cases.

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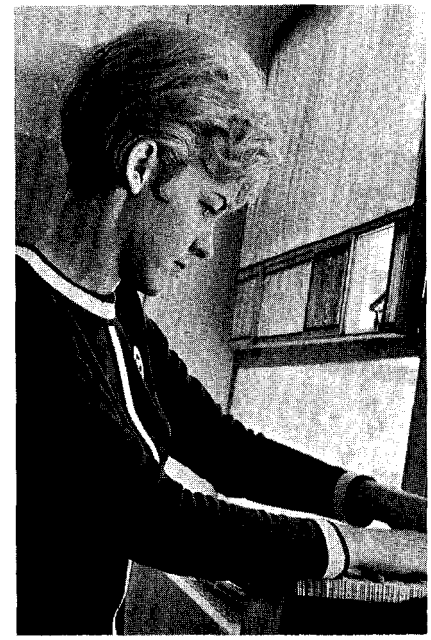
Elaine DeMouth, group secretary, is Gal Friday to the travel office.

Domitila Flock, voucher agent, handles many of the claims turned in on trips.



Linda Tyra, claims agent, checks card file for an employe's itinerary.

Group Leader Charles Harper and Bernice Nagy look over tickets to be issued to a LASL official traveler.

Travel . . .

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Official trips by LASL employes are but one facet of Travel's duties. Last year the group also handled travel for almost 1000 consultants and visiting staff members, interviewees, visiting scientists and short-term employes. There were also 271 claims made for travel by those joining the LASL staff, along with claims for shipment of household goods. And, in addition, the group handles the claim work for travel by the permanent LASL Nevada staff of some 100 people.

Employees who take members of their families with them on partly business-partly vacation trips work with both the travel office and a commercial agency, since it is Laboratory policy to handle only official travel requests. Although the travel office can request reservations for personal routing when made in

Betty Hicks records information about a LASL employe's travel reservations.

Janice Dye, one of the reservations clerks, notes another LASL trip.

Mildred Hicks checks with LASL traveler to find the most satisfactory schedule.

Jean Kelley, assistant group leader in Travel, does much of her work by phone, helping LASL employes get to their destinations.

connection with an official trip, the traveler must purchase and pick up his own tickets, since tax exemption is allowed for only the official part of the journey. Mrs. Kelley says Travel is accustomed to finding answers for such ponderous puzzles as "Can we take our dog?" "Are skis allowed on the plane?" and "Is Family Plan applicable?"

A job in Travel is not always an 8-to-5 one. During the airline strike last summer, Travel doubled up on time and effort to try to get people where they needed to go by setting up circuitous routing.

Harper gets many calls at home, often from out of town, concerning everything from arranging transportation of incoming people to solving quandaries about tickets lost en route. But most of his calls are from the Zia Company radio

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Janice Dye prepares to receive tickets printed out automatically on "teleticketing machine" in travel office.

Travel . . .

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dispatcher at the Los Alamos airstrip, whom travelers are supposed to notify about any change in their arrival or departure plans. Most often the question is a relay from a traveler inquiring about the availability of transportation to Los Alamos to meet his incoming flight in Albuquerque.

Travel emergencies crop up with regularity. They're likely to occur not only during the day, but, as emergencies will, sometimes in the middle of the night. On more than one occasion, Travel people have worked well into the night to make the necessary arrangements in emergency situations. For instance, if accidents involving nuclear material occur, it is imperative to get several LASL experts there as soon as possible.

With the number of trips doubling since 1958, the services rendered by the travel office are invaluable. Quite a change has taken place since the Manhattan Project days, when secrecy was utmost, and travelers often had to take devious routes to get to "Box 1663, Santa Fe." The Corps of Engineers handled reservations then, under the name of "U.S. Army" or Government." In 1947, after the first contract was negotiated between the University of California and the Atomic Energy Commission, the local AEC office made LASL reservations for several years. Then, in 1952, LASL's travel office went into full operation as an adjunct to the business office, functioning for the first time as both reservations and claims agent for travelers.

Godiva II, complete with closed circuit television and walnut paneled background, was the major attraction among the exhibits at the nuclear criticality safety meeting in Las Vegas. Robert Porton, left, PUB-2 group leader, discusses the LASL exhibit with meeting delegates. Porton and Robert Brashear, director of the LASL museum, manned the exhibit. Godiva II, a working prototype, is one of the museum's permanent exhibits.

Scientists Air Views On Criticality Safety

By ROBERT BRASHEAR

First steps toward common ground on which to disseminate nuclear criticality safety information and to work out safety standards equitable to both science and industry were taken in Las Vegas, Nev., in December.

Members of the Trinity and Southern Nevada Sections of the American Nuclear Society set up the national topical meeting which drew nearly 300 scientists, professors, industry and government representatives from installations around the world.

Among special guests were U.S. Atomic Energy Commissioner Gerald F. Tape and James F. Young, vice president of General Electric Corp. In addition to delegates from the United States, representatives from nine other countries took part.

The meeting was the first of its kind to be held in this country. Hugh C. Paxton, LASL N-2 group

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Delegates to the nuclear criticality safety meeting visited the MAD building during their tour of the Nevada Test Site.

Criticality Safety . . .

Continued from preceding page

leader, was general chairman, and D. R. Smith, Los Alamos criticality safety officer, was technical associate general chairman.

"Criticality information has for many years been mostly classified, so the Atomic Energy Commission and its contractors were the only ones who had access to it," Paxton said. "Even in this select group the spread of information was slow."

"Increased use of fissionable materials by commercial firms in manufacturing, fabrication and reactors has brought on a situation where safety regulations and standards do not meet the needs of those actually handling the materials. Universities, too, have found that their teaching programs lack good workable data to teach in their classes," Paxton noted.

"It is the interest of the ANS to see that this more or less remote regulation of fissionable materials by persons in Washington be placed in the hands of the people who actually have to meet the day-to-day problems which occur and are not covered by the written word," Paxton said.

"Our meeting was designed to get the ideas from university professors and to hand the ball to industry where the pinch is being felt the most."

The Academic Task Force which included representatives from 13 universities agreed in a joint paper at the end of the conference that their courses should incude nuclear criticality safety as part of the broad background. However, they felt the universities should not try to match the "experience and talents of the contractors," but rather, they should send students to those various laboratories to gain knowledge first hand. Committee members included representatives from Texas A and M, Georgia Tech, Colorado State, Mississippi State, Oregon State, Washington State, Idaho State and the Universities of Utah, Nevada, New Mexico, Arizona, Idaho and Tokyo, Japan.

Paxton, Roy Reider, H-3, and William R. Stratton, N-2, took part in the discussions. J. W. Schulte, CMB-14, chairman of the Trinity Section, ANS, was chairman of the opening session. G. R. Armstrong, member of LASL's J division in Nevada, and chairman of Southern Nevada Section, ANS, arranged for delegates to tour the Nevada Test Site on the final day of the conference.

Commissioner Tape was luncheon speaker the opening day. He told those present: "Individual safety is always very much dependent upon the behavior of the individual, especially where the individual has reasonable control of the risks. However, the innocent bystander is dependent on the actions of others and therefore must rely on the safety of their procedures. Although there may be evolutionary changes with time and there may be continuing differences in interpretation or procedures, there are no basic differences in the objectives which all of us associate with criticality safety."

Hailing the presence of delegates from other countries as "an opportunity to hear about attitudes, practices and problems in criticality safety," Commissioner Tape said: "With expanding populations and an increasingly complex technologi-

AEC Commissioner Gerald F. Tape, left, and LASL's Hugh Paxton, chairman of the national topical meeting, answer questions at a press conference.

Photos courtesy of Pan American

cal society one can expect an increasing government involvement in the life of its citizens, especially from public regulatory bodies. The crucial factor in determining our future progress is that the actions of these bodies and those carrying out the work be in a direction of collectively moving forward technically in a manner which exposes the public to essentially no risk, and, through continued successful operation by all parties, instills confidence in the public."

During a press interview later in the day, Commissioner Tape said the question of whether to postpone a major commitment to further development of the nuclear rocket system—the major program at the Nuclear Rocket Development Station near Las Vegas—is under discussion in Washington. He would not speculate on what demands for more funds to pursue the Viet Nam conflict would do to appropriations for Project Rover nor underground testing.

Young in his talk noted that "in the 20-year history of the nation's nuclear program, there have been no civilian reactor accidents which have caused loss of life or endangered public health and safety." He continued, "If we agree that nuclear power is desirable as a new fifth source of energy—coal, oil, gas and hydro-electric power are the other four—we must agree that we should try to keep it within the realm of economic feasibility. Risks cannot be reduced to absolute zero. They can, however, be reduced to such a low level as to be balanced favorably against the benefits of use in judging the desirability of this new energy source in our society today."

Paxton, who, with Dixon Callihan of Oak Ridge, has pioneered interest in criticality safety practices, spoke to the group on "The Nature and Consequences of Nuclear Accidents." He said, "In terms of the other common safety indexes, number of injuries and time lost, results of all radiation accidents in plants operated by AEC contractors represent extremely small fractions of the total —about five-tenths of a per cent of those injuries are attributable to radiation. Even multiplying by five to ten times public sensitivity to radiation accidents, plant-criticality risk does not escalate above the risk associated with any common industrial hazard."

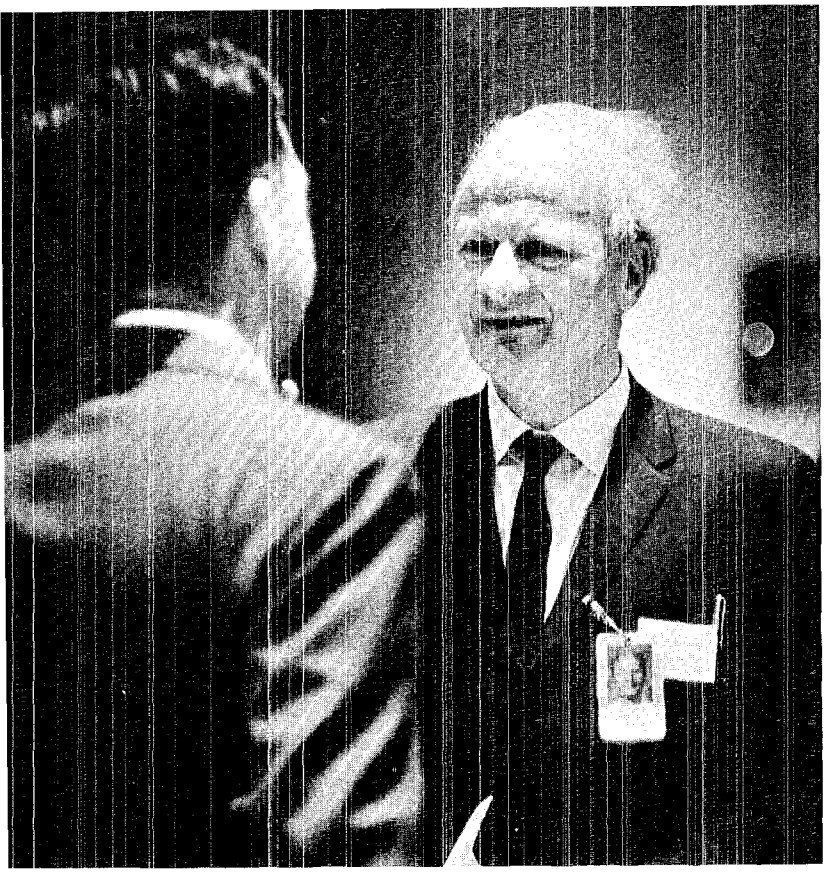
He said speakers at the conference indicated that improved control techniques can keep up with increased use of fissionable materials and their processing and fabrication. "The effectiveness of these techniques, however, could be compromised by over-regulation," Paxton said.

Roy Reider told delegates: "We are seeing in these three days an example of what has been done so well in other disciplines. A professional society representing the discipline that creates the risk is accepting the responsibility for controlling that risk. If it fails, someone else will do it for the society, and not necessarily as well."

Stratton spoke on the "Correlations of Experiments and Calculations." His talk encompassed the accuracy and dependability of computing data as compared to recorded experimental data.

Vincent Vespe, Albuquerque Operations Office, AEC, gave the program resume including presentation of a plaque to Hugh Paxton for having worked to promote the national topical meeting.

Others who worked with Paxton, Smith and Armstrong on the general committee were A. J. Smith, Air Force Weapons Laboratory, Albuquerque; R. E. Crews, Westinghouse Astronuclear Laboratory, Las Vegas; Mrs. R. E. Crews, ladies program; C. R. Garr, ACF Industries, Albuquerque; W. L. Everett and G. A. Whan, University of New Mexico; E. W. Hribar, Aerojet-General Corp.; D. C. Jameson and J. R. Morgan, Air Force Directorate of Nuclear Safety; R. M. Jefferson, C. K. Lumpkin and P. D. O'Brein, Sandia Corp.; D. P. Wood, Albuquerque Operations Office, AEC; J. M. Wright, Space Nuclear Propulsion Office.



Hans A. Bethe of Cornell University, T division leader at the Laboratory during the war and a LASL consultant since returning to Cornell, came back to Los Alamos to take part in the optical workshop.

LASL Hosts Optical Workshop

Bennett Kivel of Avco Everett Research Laboratory, Everett, Mass., chats with Rolf Landshoff, Lockheed Missiles & Space, Sunnyvale, Calif., before a workshop session.

The Los Alamos Scientific Laboratory was host to a four-day optical workshop Jan. 9 to 12. The meeting was under the joint sponsorship of the Atomic Energy Commission and the Department of Defense.

More than 70 participants from laboratories, military installations and universities attended, including Dr. Hans A. Bethe of Cornell University, Dr. Keith Brueckner, University of California, San Diego, Dr. Kenneth Watson, University of California, Berkeley, all LASL consultants, and Lt. Gen. A. W. Betts, chief of research and development, Department of the Army.

Herman Hoerlin and H. Milton Peek, J-10, served as chairman for the event.

One of the purposes of the workshop was to discuss photographic and spectroscopic data obtained from high-altitude nuclear detonations before the banning of atmospheric nuclear tests. These tests are still being analyzed for their scientific interest.

John Zinn, LASL J-10, and Arwin Dougall, a LASL consultant from the University of Texas, took advantage of a coffee break to "talk shop."

Herman Hoerlin, J-10 group leader, calls one of the sessions to order. In foreground are Hans Bethe, Bennett Kivel and Rolf Landshoff.

Lt. Gen. Austin W. Betts checks a point with Mary Sue Wooten, PUB-2, who helped with meeting arrangements.

The Technical Side

LINAC Conference, Los Alamos Scientific Laboratory, Los Alamos, N.M., Oct. 3-7.

"Computer Control of the LAMPF Accelerator" by T. M. Putnam, H. S. Butler and J. J. Smith, all MP-1.

Slow Neutron Capture Gamma Rays Conference, Argonne National Laboratory, Lamont, Ill., Nov. 2-4:

"Study of the Co^{59} (n, γ)Co^{60} Reaction" by E. B. Shera, P-2.

"External Beams and Coincidence Facilities" by E. B. Shera, P-2. (Invited paper)

Presentation at Meeting of the Capital City Lions Club, Santa Fe, N.M., Nov. 21:

"A Travelogue on Southern Spain" by W. H. Langham, H-4. (Invited Talk.)

Presentation at Colloquium, University of Wisconsin, Madison, Wisc., Nov. 28:

"The Los Alamos Meson Factory" by Louis Rosen, MP-DO.

American Society of Mechanical Engineers, Annual Winter Meeting, New York, N.Y., Nov. 29:

"The Effect of Body Forces on Near Critical Forced Convection Heat Transfer" by R. J. Hanold, N-7.

American Chemical Society, Southwest Regional Meeting, Albuquerque, N.M., Nov. 30-Dec. 2:

"Superconductivity Studies at Los Alamos" by R. D. Fowler, CMF-DO.

Presentation at Seminar, University of Illinois, Urbana, Ill., Dec. 1.:

"The Proposed Los Alamos Meson Physics Facility—Present Status and Future Plans" by Louis Rosen, MP-DO.

American Physical Society, 1966 Autumn Meeting, Nashville, Tenn., Dec. 1-3:

"On the Superconductivity in β-Beryllium and Related Phases" by C. E. Olsen, CMF-13, B. T. Matthias, University of California, San Diego, and H. H. Hill, CMF-13.

"Trapping and Energy Resolution in Semiconductor Detector" by R. B. Day, G. Dearnaley and J. M. Palms, all formerly P-DOR.

Second Conference on Multiple Molecular Forms of Enzymes, New York, N.Y., Dec. 1-3:

"Genetic and Epigenetic Forms of Malate Dehydrogenase in Neurospora" by K. D. Munkres, H-4.

AIAA Third Annual Meeting and Technical Display, Boston, Mass., Dec. 2:

"Rover Testing Facilities" by Keith Boyer, J-DO. (Invited talk.)

Seminar, Department of Biology, Yale University, New Haven, Conn., Dec. 5:

"Genetic and Epigenetic Forms of Neurospora Malate Dehydrogenase" by K. D. Munkres, H-4. (Invited talk.)

Presentation at Lawrence Radiation Laboratory, Livermore, Calif., Dec. 5:

"The Plutonium Contamination Incident in Spain" by W. H. Langham, H-4. (Invited talk.)

Presentation at Physics Department, Texas Agricultural & Mechanical University, College Station, Texas, Dec. 5-6:

"Lattice Dynamics of Diamond" by J. L. Yarnell, P-2.

Presentation at Physics Department Colloquium, University of Houston, Houston, Texas, Dec. 6:

"The Geomagnetic Tale" by Sidney Singer, P-4. (Invited talk.)

British Ceramic Society Meeting, Shelton, England, Dec. 6-7:

"Anomolous Superconducting Properties of Refractory Carbides and Nitrides of Group IVa and Va Elements" by A. L. Giorgi, E. G. Szklarz and T. C. Wallace, Sr., all CMB-3. (Invited talk.)

American Nuclear Society, National Topical Meeting on Nuclear Criticality Safety, Las Vegas, Nev., Dec. 12-15:

"The Nature and Consequences of Nuclear Accidents" by H. C. Paxton, N-2. (Invited talk.)

"Correlations of Experiments and Calculations" by W. R. Stratton, N-2. (Invited talk.)

"Application of Industrial Safety Practices to Nuclear Safety" by Roy Reider, H-3. (Invited talk.)

Meeting on Fundamentals of Gas-Surface Interactions, San Diego, Calif., Dec. 14-16:

"Surface Configurations of the (111) Plane of UO_2" by W. P. Ellis, CMB-8.

One Hundred Twenty-Third American Astronomical Society Meeting, Los Angeles, Calif., Dec. 27-30:

"Coronal Emission Line Profiles of 5303 Obtained at the May 30, 1965, Total Solar Eclipse" by D. H. Liebenberg, CMF-9.

"Pre-perihelion Airborne Observations of the Na I Emission Line from Comet Ikeya-Seki" by D. H. Leibenberg, CMF-9, and Paul Rudnick, J-16.

American Physical Society Meeting, Stanford University, Stanford, Calif., Dec. 28-30:

"Emission of Light Charged Particles from Cf^{252}" by S. L. Whetstone, Jr., P-9, and T. D. Thomas, Princeton University.

"The Neutron-Deuteron Scattering Lengths" by J. D. Seagrave, P-DOR.

"Self-Consistent Band Structure of Aluminum by an APW Method" by E. C. Snow, CMF-5.

"Elastic and Inelastic Scattering of Fast Neutrons from Natural Silicon" by A. R. Sattler, Sandia Corporation; J. C. Hopkins and D. M. Drake, both P-DOR; and Henri Conde, formerly P-3.

"Triton-Induced Reactions in Very Light Nuclei" by R. H. Stokes, P-12. Invited talk.

new hires

CMF Division

Delbert M. Jones, Madison, Wisc., CMF-9

GMX Division

Robert F. Fisher, Los Alamos, GMX-3

Robert A. Piatt, Santa Fe, N. M., GMX-3

Paul E. Tate, Los Alamos, GMX-7 (Casual-Rehire)

Mildred E. Hargrove, Los Alamos GMX-7 (Rehire)

Barney A. Cushing, Los Alamos, GMX-11

K Division

Clarence L. Woodcock, Pearl Harbor, Hawaii, K-4

N Division

Betty J. Puskar, East Pittsburgh, Pa., N-4

Marilyn J. Lindholm, Los Alamos, N-6 (Rehire)

P Division

Marvin P. Vidrine, Hololulu, Hawaii, P-2

Patricia L. Rood, Bandelier National Monument, P-10 (Part Time)

Personnel Department

Elizabeth J. Wooten, Los Alamos, PER-1 (Casual)

Madge E. Mott, Los Alamos, PER-1 (Casual)

Public Relations

Robert H. Masterson, Upton, N. Y., PUB-DO

Shops Department

David A. Cook, Livermore, Calif., SD-1

John R. Romero, Los Angeles, Calif., SD-1

Oras D. Cossey, Panhandle, Texas, SD-DO

T Division

Wayne R. Meyer, Mountain View, Calif., T-1

LASL Science Hall Hosts Record Number of Visitors

A record number of visitors came to Los Alamos during 1966. The LASL Science Hall and Museum—where most of the visitors stop—drew 52,439 people from all walks of life, from every state in the union and from all over the world.

Signatures in the guest book include statesmen, generals, scientists, students and families just touring this part of the country. Among the 68 foreign countries represented are near neighbors such as Canada, Mexico and Cuba, and some nations half a world away—Russia, Thailand, Australia, New Zealand, Viet Nam and Venezuela.

Tours and meetings contributed a sizeable number of the visitors. PUB-2, the community relations side of the public relations department, which handles tours and meetings as well as the operation of the museum, hosted 213 one-day visits by special groups ranging from school children to scientists. Besides going through the museum, these visitors went on guided sightseeing tours of the community or laboratory areas, viewed movies, and, in some cases, visited inside some of the labs.

In addition, there were 40 meetings and visits lasting from two days to a week—ranging from the two-day Edison Days program for some 800 senior science students from five states to the Seminar on Intense Neutron Sources which drew noted scientists from all over the world.

Robert Y. Porton is PUB-2 group leader, Robert Brashear is museum manager and Patrick G. Smith handles tours and meetings.

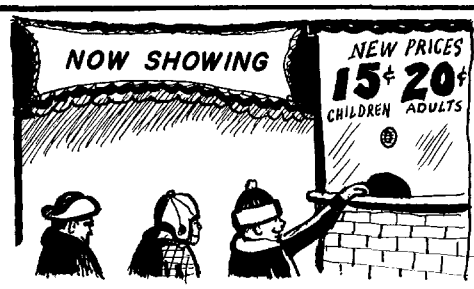
Three LASL Employes Retire

Mary E. Bowden, SD-O, retired Jan. 6 after 15 years with the Los Alamos Scientific Laboratory. She joined the Laboratory with D-2 Libraries Nov. 16, 1951, and transferred to SD-O Nov. 1, 1954. Although born in Texas, she came to Colorado as a child, and taught school in Kim and Branson, Colo., for several years. Her husband, Orel, is an employe of the Zia Steam Plant, so they will continue to live in Los Alamos. They have a son, Dewitt, of Dallas, Texas, and a daughter, Mrs. Janie Kelly, of Los Alamos.

James E. Reese, SD-O toolcrib attendant, retired Jan. 6. He has been with LASL since June 9, 1952. Reese was born in Dewey, Idaho, a town he says "isn't even on the map any more." From there, he went to Pennsylvania and then to California. He served in the Armed Forces during World War I and re-enlisted for three years following. A resident of Santa Fe, he'll continue living there with his wife, Mary. They have three daughters and a son, all grown and living elsewhere. Reese says he is making no definite plans, but will "keep busy."

O. C. Creed, administrative aide in GMX-3, retired Jan. 10. After coming to Los Alamos first with the Army in 1945, he joined LASL in September, 1946, after discharge. In 1948 he terminated, but returned as a re-hire in GMX-2 in February, 1949. He transferred to GMX-3 in May, 1953. With his wife, Rae, who recently hired on in GMX-3, he plans to continue living in Los Alamos. They have one daughter, Mrs. JoAnn Klutts, of Groves, Texas, and four granddaughters.

20 years ago in los alamos



Culled from files of The Los Alamos Times, January, 1947, by Robert Y. Porton

Site Transfers to Atomic Energy Commission

USAEC took over the organization and facilities of the Manhattan Engineer District at midnight, January 1. The transfer was by presidential order under the terms of the Atomic Energy Act, which created the five-member commission.

Community Chest Drive Starts Monday

Los Alamos was asked to open its purse strings this month in the Hill's first Community Chest drive. The Chest campaign, aimed at a minimum goal of $6,000, will support community organizations serving the youth here, civilian and military alike—Boy Scouts, Girl Scouts, USO and Youth Center. Organized to enlist financial support of the four groups serving the morale, welfare, recreational needs of the town's children and young people, the Project's Chest campaign is seen by many residents as the first test of Los Alamos as a peacetime community.

Masonic Lodge Being Organized

Forty-five of the estimated 200 Masons in Los Alamos have organized and petitioned the Grand Lodge of New Mexico for a charter. At a meeting in the high school, the proficiency examinations were passed. Dispensation is expected sometime next month.

New Movie Prices

Effective tomorrow, the charge for admission to Theaters No. 1 and 2 will be 20 cents for adults and 15 cents for children, according to the special services officer. The price change is in accordance with a new War Department regulation on admission to military theaters. Formerly, the Los Alamos rate was 15 cents for adults and 10 cents for children.

Hill Chapel Construction Authorized

Construction of a chapel for Los Alamos has been authorized by Maj. Gen. Leslie R. Groves, commanding general, Manhattan Project, and will begin as soon as detailed plans are prepared and an appropriate site is selected. Post Commander Col. Herbert C. Gee stated in an interview that the recent show of interest on the part of Los Alamos residents in the construction of a chapel seemed to indicate that a Sunday school wing could be built adjoining the new chapel to be financed entirely by local subscription.

what's doing

LITTLE THEATER: "Absence of a Cello," comedy, Civic Auditorium, Jan. 27 and 28, 8:30 p.m. Tickets—$2 for adults, $1 for students—available at the door. For reservations on season tickets, call Joan Dare, 8-4938. For season tickets, contact Kay Anderson, 2-5301.

FILM SOCIETY: Civic Auditorium. Admission by single ticket, 90 cents, or season ticket, $4. Tickets available at door. Wednesday, Jan. 18, 7 and 9 p.m., "Murder Ahoy," British comedy.

TRAVEL SLIDE and FILM PROGRAM: Mesa Public Library, Jan. 19, 7:30 p.m., "Australia," program by Darol Froman.

PUBLIC MEETING: Candidates for Los Alamos board of education will speak briefly and answer questions from the audience. Wednesday, Feb. 1, 8 p.m., Mesa School auditorium.

OUTDOOR ASSOCIATION: No charge, open to the public. Contact leader for information about specific hikes.

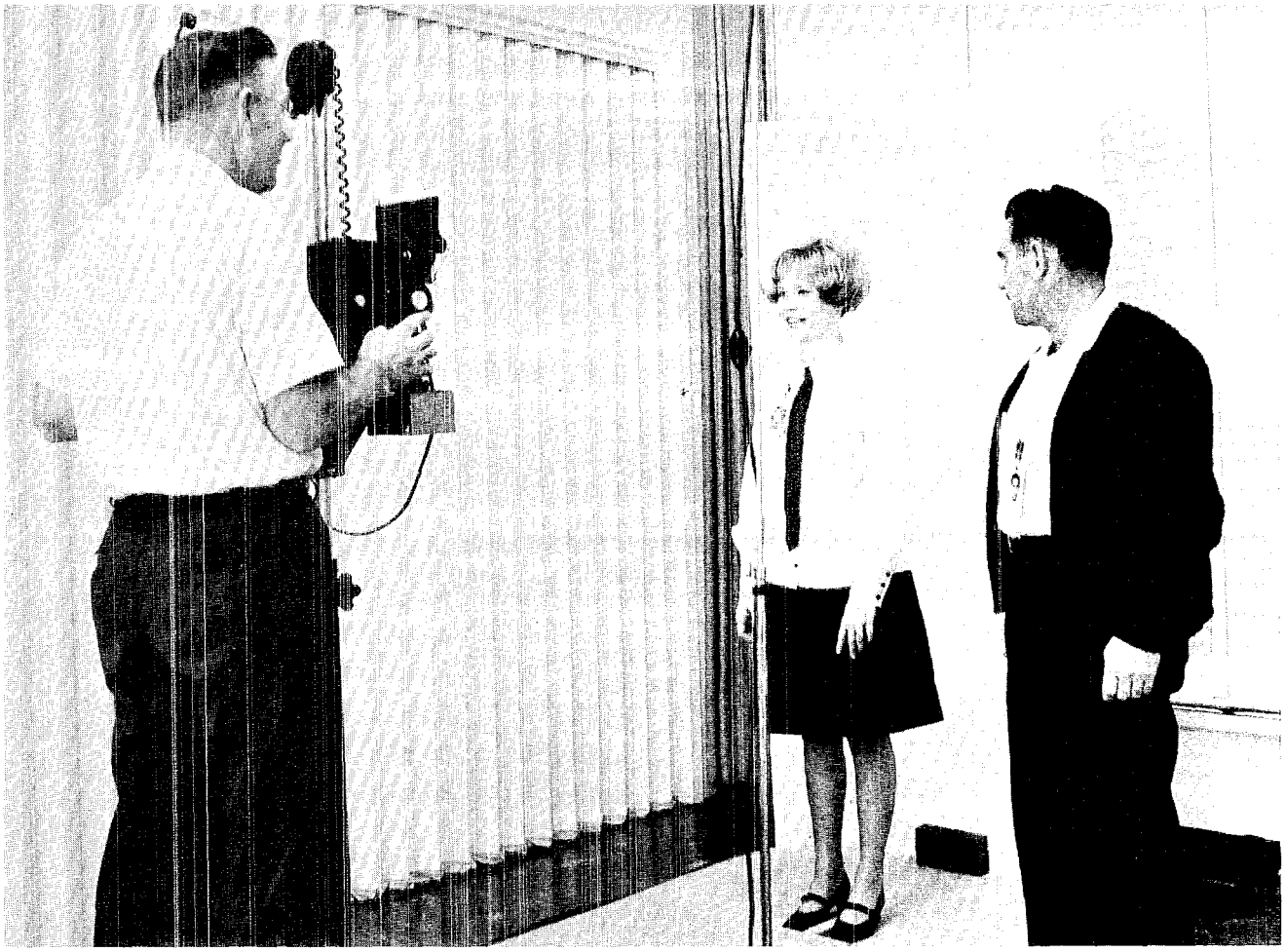
- Sunday, Jan. 15, San Antonio Mountain on skis or snowshoes. Terry Gibbs, leader.
- Sunday, Jan. 22, Pipeline Road on skis or snowshoes. Ed Kmetko, leader.
- Saturday, Jan. 28, snowshoe/ski trip. Mike Williams, leader.

PUBLIC SWIMMING, Los Alamos High School Pool, Adults 35 cents, children 15 cents. Saturday and Sunday 1 to 6 p.m.; Monday, Tuesday, and Wednesday 7:30 to 9:30 p.m.

LOS ALAMOS SKATING ASSOCIATION: Schedule for use of local ice rink, Los Alamos Canyon:

- Mondays: After-school session, 3 to 5 p.m. (Small children encouraged to attend.) General skating, 7 to 9:30 p.m. (Family night—special family rate $1.25.)
- Tuesdays: "Mothers and Tots" session, 9:30 to 11:30 a.m.; After-school session, 3 to 5 p.m.; adults only, 7:30 to 10 p.m.
- Wednesdays: After-school session, 3 to 5 p.m.; general skating, 7 to 9:30 p.m.; hockey team, 9:30 to 10:30 p.m.
- Thursdays: "Mothers and Tots" session, 9:30 to 11:30 a.m.; after-school session, 3 to 5 p.m.; Figure Skating Club patch session, 6 to 7:30 p.m.; adults only, 7:30 to 10 p.m.
- Fridays: After-school session, 3 to 5 p.m.; "Game Night" (primarily for teenagers), 7 to 9:30 p.m.
- Saturdays: Hockey during the morning; general skating, 2 to 4:30 p.m.; "Date Night" (high school and young adults), 7 to 10 p.m.
- Sundays: Professional lessons during the morning; general skating, 2 to 4:30 p.m.; Figure Skating Club patch session, 6 to 7:30 p.m.; adults only, 7:30 to 10 p.m.

Season tickets $3 for students through high school; $5 for adults. General admission students 25c, adults 50c. Rink telephone is 2-4500.



More than 7000 Los Alamos people will get new badges soon in accordance with Atomic Energy Commission regulations that require badge designs to be changed every five years. All LASL, Zia Company and AEC employes are being rephotographed during the next few weeks in preparation for the new badges. Every employe of the three organizations will get a badge of the new design, regardless of how long he has had his present one. The badge design now in use was first issued in April, 1962. Along with issuance of new badges, the area access designations will be changed from the present 14 areas to 7. A new camera was devised to save some of the steps in the badge making process. Designed by Joe Shores, AEC photographer, and built by Berlyn Brixner, GMX-9 group leader at LASL, the camera simultaneously photographs both the badge holder and an IBM card containing the essential information for his badge. Above, AEC photographer Quentin Jones tries out the new camera by photographing Candy Smith, an AEC employe, as Shores looks on.

BACK COVER:

Short ski jump for a small skier? Four-year-old Ricky Rochester obligingly climbed to the top of a playground slide for PUB's photographer, Bill Jack Rodgers. But when the photo session was over, he was all too willing to try out his skis. Rodgers managed to talk him into the more conventional method of coming down the slide. Ricky is the son of the Richard Rochesters (GMX-7).

Henry T. Motz
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